



**Summary of Policymakers' Workshop on the Integrated
Assessment of Energy Options and Health Benefits for the
Buenos Aires Metropolitan Area**

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On October 7-8, 2002, a Policy Workshop was held at the Secretariat of Environment and Sustainable Development in Buenos Aires that brought together national and municipal policymakers and experts to review the initial results of the study of *Integrated Assessment of Energy Options and Health Benefits for Buenos Aires* and discuss policy implications and identify priorities for future research and US-Argentina collaboration. The workshop was attended by over 100 government officials and experts including representatives from the Secretariat of Environment and Sustainable Development, the Secretariat of Science and Technology, the Secretariat of Energy, the Transportation Department of the Government of the City of Buenos Aires, the Health Department of the Government of the City of Buenos Aires, the National Atomic Energy Commission, the National Gas Regulation Entity, the Gas Distributors Association, the IPCC, the University of Buenos Aires, the University of Mendoza, and the Universidad Nacional del Sur. This report presents a summary of the study, discussions, and outcome of this high-level meeting.

The purpose of the workshop was to:

- Present the project report, analysis and results to policy makers and experts from Buenos Aires
- Obtain feedback from policy makers and experts on project, project results and lessons learned
- Develop recommendations for follow up activities, including implementation of projects and continuing collaboration
- Identify or assess the impact of this work on policy and policy development in Argentina

The first half of the day was spent by the IES Argentina technical team describing the results of the project. The second half of the day was filled with presentations from various technical experts, and government officials working on related issues, which was then followed by a discussion of next steps.

I. Background

Work on the U.S. Environmental Protection Agency's Integrated Environmental Strategies (IES)

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project in Buenos Aires, Argentina was initiated in October 2000. While extensive work had been done in Argentina in the past on possible greenhouse gas (GHG) mitigation measures, less attention had been given to the more immediate environmental and health benefits that would result from these measures. The IES project attempts to fill that gap by quantifying the health benefits resulting from adoption of measures to reduce GHG emissions and improve air quality, especially focusing on the transportation sector. Goals of the project include the identification and assessment of potential win-win strategies and measures for GHG and air pollution mitigation. The project also aims to raise awareness and technical capabilities in analysis and implementation of integrated strategies among policymakers and researchers.

The Argentine team working on the IES project is led by Dr. Fabián Gaioli of the Physics Department of the Universidad Nacional del Sur and Coordinator of the Climate Change Unit in the Argentine Secretariat of Environment and Sustainable Development, part of the Ministry of Social Development. He was appointed to the Coordinator post in part due to his work on IES. Dr. Gaioli also designed the scenarios to be analyzed in the project. Dr. Pablo Tarela of the Instituto Nacional del Agua y el Ambiente and the University of Buenos Aires is leading the work on air quality modeling and emission factors. Dr. Mariana Conte Grand of Universidad del CEMA is leading the economic analysis of air pollution health impacts.

II. Study Summary

Methodology

The Argentina IES study analyzes specific mitigation options in three scenarios (baseline, mitigation, and integrated) considering GHG and criteria pollutant abatement of the various options. Specific options include compressed natural gas penetration, efficiency improvements and modal substitution in the transport sector and increased building energy efficiency. The potential GHG mitigation and the avoided health costs of the associated measures were estimated for the sectors considered. GHG emission reductions and criteria pollutant abatement are estimated for the period 2000-2012, using nitrogen oxides (NO_x) and particulate matter (PM) as the reference pollutant for estimation of air quality improvements.

Mitigation Scenarios

The scenarios are partially based on the available information from a national study published in 1999 (ARG, 1999), in which the 1997 GHG inventory (with a revision of the 1990 and 1994 inventories), macroeconomic and sectoral projections for the period 1997-2012 were performed, and several GHG abatement measures were identified.⁷ This precedent plus the fact that the first commitment period of the Kyoto Protocol finishes in 2012, justifies the election of the time period (2000-2012) for the analysis. By recommendation of the authorities of the Argentine

⁷ At this point a note of caution must be taken into account. The Argentina team has focused on providing methodological contributions. The models they have developed introduce a fine structure into the scenarios and inventories development. In this respect some fine-graining corrections lost sense in relation to the uncertainties associated to the determination of some variables and parameters of the models. Nevertheless the contribution is ready to be used when more precise data is available. On the other hand, projections for the period under analysis were performed based on macroeconomic studies developed in times of a very different economic situation with respect to the current one (ARG, 1999). The report was initiated before the strong economic changes took place. However, that macroeconomic prospective analysis still remains the only source for long-term projections.

“Secretaría de Ambiente y Desarrollo Sustentable” at the time the project began, the team developed scenarios considering the overall mitigation potential of most likely measures (greater penetration of CNG, technology improvements, incorporation of new hydroelectric plants, potential for energy efficiency, etc.) more than studying the punctual impact of each one of them. This approach allows the team to estimate the potentiality to reduce emissions and the ancillary benefits associated with it, in order to show policy makers the necessity to pay more attention to promote the search of adequate options, policies, incentives, and projects that can accomplish the estimated GHG and pollutants mitigation.

The transportation sector is one of the most relevant in terms of potential mitigation actions. It accounts for 30% of the CO₂ emissions of the energy sector and represents the 15.5% of the total GHG emissions of Argentina. In addition, it is the most relevant regarding local air pollution, contributing with more than the eighty percent of the total emissions in the Buenos Aires Metropolitan Area. Emissions from the electricity sector are known to be small compared to emissions from the transport sector, but there are several GHG mitigation options the team decided to evaluate. In this framework, the precise scenarios we have established are:

a) *A baseline scenario (BS)*, which includes the evolution of emissions resulting from the productive activities in the region under analysis, including the business-as-usual evolution of the economy, industrial activities, etc. The team built one for transportation (*TBS*) and another for energy (*EBS*). The two scenarios were first analyzed separately and then they were joined together to develop a single set of emission estimates for the BS.

b) *A mitigation scenario (MS)* that takes into account the GHG mitigation potential for BAMA. The team has one of such scenarios for transportation: the Compressed natural gas scenario (*CNGS*), which considers a technology-based measure related to the substitution of diesel and gasoline fueled vehicles for compressed natural gas (CNG) ones. This scenario allowed the team to analyze the impacts of fuel substitution scenario alone, without considering additional measures which, in general, are not motivated by climate change reasons. Then, there are two mitigation scenarios for the energy sector: an Hydropower scenario (*HPS*) that includes the installation of new dams influencing the dispatch of thermal plants in BAMA and a Power-save scenario (*PSS*), which estimates the reduction of the electricity consumption by introducing most efficient household appliances and lightening. Mitigation scenarios were joined together with other additional mitigation measures to develop and integrated scenario (IS, see below) in order to estimate emission reductions in comparison with the BS.

c) *An integrated scenario (IS)* is finally considered. In this scenario some improvements in engine technology and measures devoted to reduce local air pollution are also included. The integrated scenario includes both the CNG substitution and the air quality policy assumptions in the transport sector analysis and the two mitigation scenarios of the electric sector.

Table 1 below summarizes the scenarios analyzed in this study:

Table 1: Scenarios assumptions

Baseline (BAU)	Mitigation (technology side)	Integrated (demand side)
Transport		
Continuity of diesel prevalence in transportation fleet	Accentuated CNG penetration in private cars and taxis	Expansion of railways
Low CNG penetration	Conversion of the public transport from diesel to CNG	Speed controls
Decentralization of the City of Buenos Aires	Technology improvements	Capacity building for bus drivers
BAU technological advances	Incentives and fuel price policies	Road improvements
Electricity		
No new investments in hydro power	Addition of hydroelectricity	Renewable energy programs
New combined cycles	Power saving through efficient household appliances and lightening	Energy efficiency programs
Atucha II (nuclear) onset	Incorporation of low consumption engines	No restrictions to natural gas supply

Table 2 shows the main variables characterizing the scenarios.

Table 2: Characteristic variables

Transport	Electricity
Zone characterization	Power plant locations
Fleet composition and transportation modes	Generation modes
Fuel use	Fuel use
Total number of vehicles	Thermal efficiency
Emission factors	Utilization factor
Specific consumptions	Emission factors
Kilometers traveled	Electricity demand
Circulation speed	Dispatch analysis
Aging of the fleet	Background emissions

Results

The report concludes that by 2010, implementation of modest GHG mitigation measures for the electricity generation and transport sectors could avoid 15-21 MT CO₂ emissions and provide 90-2,900 M \$US in air pollution health benefits due to reductions in morbidity and mortality effects. Transport sector measures only involve BAMA emissions but electricity sector emissions account for the entire country. Table 3 summarizes the main results.

Table 3: Emission reductions and health benefits in different scenarios

GHG mitigation results			
CO ₂ emission reductions (Ggr)	2010	Base/Mitigation	(Transp 900; Elec 15,000)
		Base/Integrated	(Transp 6,500; Elec 18,000)
	2012	Base/Mitigation	(Transp 1,300; Elec 21,000)
		Base/Integrated	(Transp 8,300; Elec 21,000)
Health benefit results			
Long-term mortality	2010	Base/Mitigation	1,463
		Base/Integrated	3,957
	2012	Base/Mitigation	1,928
		Base/Integrated	4,829
Value (year 2000 US\$)	2010	Base/Mitigation	(88; 895)
		Base/Integrated	(227; 2,383)
	2012	Base/Mitigation	(114; 1,175)
		Base/Integrated	(275; 2,902)

III. Policymakers and Stakeholders Perspectives

All participants recognized that the study methodology, which, for the first time in Argentina, applied a quantitative evaluation approach that integrates energy, emissions and human health impacts in energy and environmental policy analysis, as a highly valuable policy analysis tool.

The general consensus was that this tool will be extremely useful to policymakers once completed. It was suggested that a more simple tool be developed that policymakers could better understand and easily use in order to better understand and then have quantitative data to use to recommend policy or technology measures.

Some of the interesting comments and questions raised by stakeholders during the discussion period included:

- Fabián Gaioli is interested in improving the data. The Argentine team knows they produced a good piece of work, but it still could be improved. That will be the goal of the next phase of work.
- When asked how the scenarios were decided, Fabián discussed that the consideration of the scenarios were based on previous studies. They looked at macroeconomic data, rather than specific projects, because of the information available.
- Regarding the health effects analysis, Mariana noted that they did not evaluate accidents or time loss through traffic jams, but instead looked at health and quality of air, and did not include other factors.
- Fabián noted that it will be very important to look at transportation demand management measures, and that they are using models related to systems dynamics.
- One participant asked if the idea was to submit these results to policymakers. Fabián responded that yes, one of the main goals of the work is to submit this to policymakers in order for certain measures to be implemented. They hope to hold another meeting in the

near future to discuss each measure in more detail with the policymakers.

- A representative from ICLEI asked if the study could be made at the national level, since the current study is at the local level. This will be carried out in the next phase of work.

Policymakers stated their commitment to collaborate in a join policy program based on the work performed in the first stage by the IES team.

- A representative from the University of Mendoza discussed their work which is very similar to the IES work. He stated that there may be an opportunity to collaborate with them on this effort in order to extend the analysis to other regions of the country.
- A representative from the Argentina Council for Sustainable Development noted that the private sector should be included in the process for selecting measures, and that we need incentives for project development and that this project is good in that it does demonstrate local benefits to communities. He pointed out that this Council is working on Scenarios Development to provide additional data to policymakers.
- The representative of the Government of the City of Buenos Aires highlighted the close link between the IES work and the government policies and proposed to work together in identifying the best way to implement some measures according to the analyzed mitigation potential.
- The representative of the Clean Air Initiative mentioned its interest in a cooperation framework, taking into account that ICLEI is also collaborating with the government in providing tools and guidelines to develop inventories and policy recommendations.
- The representative of the Secretariat of Science and Technology remarked that its agency is able to provide some funds to go ahead with this kind of studies in the next call for research and technological developments.
- The representative of the Secretariat of Environment and sustainable Development stated that the study will form part of one of the key issues considered by this State Secretariat, for which they have already created a national program on climate change mitigation and ancillary benefits.
- A representative of INA agreed in bringing a close collaboration with the IES team to provide relevant data in the transport sector.

IV. Future Steps

Conclusions and Discussion of Possible Activities for Next Phase:

- Analysis of specific mitigation measures to support cost benefit analysis and policy decisions
 - Consideration of transportation management policies (with the help of EPA experts, e.g. Roger Gorham)
 - Consultations with policymakers regarding air quality and GHG policies
 - Inclusion of costs of measures as part of the analysis
 - Bottom up measure-by-measure analysis (to be able to distinguish the GHG mitigation and health benefits on a measure-by-measure basis)
- Development of analytical tools, for example methodologies, models, computer programs
 - Collaboration with Chile team on analytical framework for the health analysis (there is an existing permanent communication with Luis Cifuentes and Héctor Jorquera, who, by the way, participated in the workshop)

- Improvement of health effects information, for example in collaboration with Secretariat of Science and Technology and the Ministry of Health
 - Collaboration with other cities in Latin America on other aspects of the analysis (preparing joint studies to apply to other international funds)
 - Development of META model for comparative studies of co-benefits potential in the region (some insights are intended through a IAI grant)
- Emissions Inventory improvement
 - Inexpensive samplers and analysis equipment (there is a proposal to get some in-use equipment from US)
 - Collaborate with other programs, such as CAI (this initiative is going ahead)
- Improve Air Quality model
 - Additional pollutants such as ozone and fine particles (Pablo is going to improve his air quality model, probably in collaboration with Héctor Jorquera and EPA people)
 - Extension of this initiative to other cities in Argentina (contacts with people of Bahía Blanca, Mendoza, and Rosario were already established)

Promoting Implementation of the Next Phase:

- The IES Argentina team, in collaboration with NREL, has developed a concept paper and proposal to leverage funds from Argentine government agency FONCyT.
- The IES Argentina team, in collaboration with NREL, will continue to identify existing resources and related efforts.
- The IES Argentina team will identify needs for technical and financial assistance.
- The IES Argentina team, in collaboration with NREL, will develop a collaborative plan for how to use these methods in larger project.